Mar 28th, 4:00 PM - 5:30 PM

Investing Instructional Strategies in a Human Anatomy and Physiology Laboratory

Ranjan Kumar Behera  
University of Georgia, ranjan@uga.edu

DeLoris Wenzel-Hesse  
University of Georgia, hesse@uga.edu

Follow this and additional works at: https://digitalcommons.georgiasouthern.edu/sotlcommons

Part of the Curriculum and Instruction Commons, Educational Assessment, Evaluation, and Research Commons, Educational Methods Commons, Higher Education Commons, and the Social and Philosophical Foundations of Education Commons

Recommended Citation
Behera, Ranjan Kumar and Wenzel-Hesse, DeLoris, "Investing Instructional Strategies in a Human Anatomy and Physiology Laboratory" (2013). SoTL Commons Conference. 45.  
https://digitalcommons.georgiasouthern.edu/sotlcommons/SoTL/2013/45

This presentation (open access) is brought to you for free and open access by the Conferences & Events at Digital Commons@Georgia Southern. It has been accepted for inclusion in SoTL Commons Conference by an authorized administrator of Digital Commons@Georgia Southern. For more information, please contact digitalcommons@georgiasouthern.edu.
Investigating Instructional Strategies in a Human Anatomy and Physiology Laboratory

Ranjan K. Behera1 and Dr. DeLoris Wenzel Hesse1,2
1Department of Cellular Biology, 2 GHSU/UGA Medical Partnership, University of Georgia, Athens, GA

Abstract

Laboratory teaching, an essential component of Human Anatomy and Physiology (A&P) courses, is currently facilitated by a lecture-based presentation. The application of active learning strategies in teaching has been documented to increase student performances. However, studies on the effectiveness of these instructional strategies in A&P laboratories and the evaluation of students’ preferences have been inadequate. The current study compared both effectiveness and student acceptance in the context of adoption of a team-based teaching method for the A&P Laboratory. We offered team-based projects in two out of six laboratory sections. The group that engaged in team-based projects during half of the laboratory sessions, these active learning projects consisted of near-peer teaching, group discussions, and other activities. Other sections (control group) were taught only in the traditional manner. Both methods were used to assess student performance. Qualitative analyses were performed on the anonymous feedback that was provided by the students who participated in this study. The data indicate that students in the experimental group (team-based projects) outperform those taught using traditional methods. The team-based method according to the survey was better appreciated among students, which improved teacher-student interaction and facilitated peer discussion. It also promotes critical thinking, kept student more engaged in the lab, and helped them develop skills outside academics. We believe that, by optimizing team-based teaching in A&P laboratories, we can create an active learning environment to enhance students’ performances, knowledge, and skills on the subject.

Methodology

Students in the lab participated in traditionally taught labs as well as those that are team-based. Lab sections were randomly assigned as “lab A” or “lab B”. For example, students in lab A were taught material in muscle lab 1 using the traditional method, and the material in muscle lab 2 using a team-based method. Those students in lab B will be taught material in muscle lab 1 using a team-based method, and material in muscle lab 2 using a traditional method. All scores are compared and analyzed (lab A and lab B; traditional and team-based; order of labs). Data are comprised of regular assignments that students completed through their regular course materials and assignments. No data was collected during class discussions. Students were also asked to provide anonymous feedback regarding their teaching-style preference. At the end of the semester students were provided with a “paper-and-pencil” survey to fill out. They were advised to make their feedback anonymous by not putting their names or any kind of identification mark on the paper.

Results

(i) Preliminary Class Assessment

Q.1. What is the best way for you to learn in the lab?

<table>
<thead>
<tr>
<th>Total response: 46</th>
<th>Response</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Visual (Models, Posters, Diagrams, PowerPoint, Animations, Movies)</td>
<td>71.7%</td>
<td></td>
</tr>
<tr>
<td>ii. Discussion/Interaction</td>
<td>10.9%</td>
<td></td>
</tr>
<tr>
<td>iii. Activity (Hands-on, experimentation, dissection)</td>
<td>15.2%</td>
<td></td>
</tr>
<tr>
<td>iv. Review</td>
<td>6.5%</td>
<td></td>
</tr>
<tr>
<td>v. Exploration (Story, Example)</td>
<td>9.1%</td>
<td></td>
</tr>
<tr>
<td>vi. Self Study</td>
<td>15.2%</td>
<td></td>
</tr>
</tbody>
</table>

Q.2. What is your expectations from this lab?

<table>
<thead>
<tr>
<th>Total response: 43</th>
<th>Response</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Improve knowledge base</td>
<td>93.0%</td>
<td></td>
</tr>
<tr>
<td>ii. Supplement to lecture class</td>
<td>79.5%</td>
<td></td>
</tr>
<tr>
<td>iii. Other</td>
<td>9.3%</td>
<td></td>
</tr>
</tbody>
</table>

The preliminary class assessment was employed as a probe to determine the appropriate tools for effective student learning. Student participation and feedback was voluntary and anonymous. Table A and B are representative of the student views.

(ii) Quantitative Assessment of the Effectiveness of the Teaching Strategies

A: Entire Class

B: Entire Class-Test Lab

C: Test Lab

Comparative graphical representation of the mean student scores in different lab practices. A total of seven lab practices (X-axis) was offered during the semester with a maximum of 50 points each (Y-axis). There were 145, 96, and 49 students in A, B, and C respectively. The error bar represents the standard deviation of the student scores in a group.

(iii) Qualitative Assessment of the Students’ Perception of the Teaching Strategies

Response A: “Traditional” Teaching Method using PowerPoint and lecture

Response B: Team Based Teaching Method using games and other group-based activities

Response C: No preference

Q. What do you think are the best teaching methods used in this lab and why?

Project Summary

The Human Anatomy and Physiology (A&P) labs are aimed at improving student understanding of the anatomy and physiology concepts through hands-on experience and complementing the lecture classes. However, the laboratory sessions are not very often well designed to fulfill these basic objectives. Lecture based teaching is still in practice in the lab and the focus on the use of team based active learning strategies has been undermined. We studied the effectiveness of the team-based instructional strategies in the A&P laboratories. Preliminary class assessment revealed that students preferred visual learning of the anatomical concepts. We optimized the use of available visual aids along with educational games, role playing, concept mapping, group discussion, near-peer teaching, and simulations in experimental labs to evaluate the effectiveness of the team based method over the traditional method. Both quantitative and qualitative assessment was performed to derive the conclusions.

The quantitative assessment based on test scores indicated that the groups taught by team based method scored better in 4 out of 7 sessions. This performance could be attributed to team based teaching strategy. The student survey suggests that as many as 52% of the students preferred the team based method of teaching. The team based method of teaching also found to be more engaging and interactive which is essential for optimum learning. Also, students agreed that team based teaching method promotes critical thinking skills among students. Based on these information we believe that team based teaching methodology is more appropriate in the A&P labs because of the fact that it has extra advantages over traditional method of teaching.

Conclusion

• Most students expressed that visuals are the best means for them to learn in the Human Anatomy and Physiology Lab.

• Students expected that the laboratory sessions will improve their learning level in Anatomy and Physiology and supplement the lecture classes.

• Students in the lab that were taught by team based teaching strategy outperformed the control group in 57% of the (out of 7) laboratory sessions.

• The team based teaching method was appreciated by 52% of the students surveyed where as 31% students preferred the traditional method of teaching and 17% students did not have a preference.

Acknowledgements

Sincere thanks to Dr. DeLoris Hesse for generously supporting the teaching project under close supervision. Thanks to the Institutional Review Board (IRB) at UGA for reviewing and approving the proposal.

Many thanks to the students who voluntarily participated in the study and facilitated the success of the project.

I also thank my advisor Dr. Kojo Mensa-Wilson for the support towards my teaching, related research, and conference presentation.

Project Number: 2012-10976-0

Title of the Study: Investigating instructional strategies in a Human Anatomy and Physiology laboratory

Principal Investigator: Dr. DeLoris Wenzel, Cell. Bio. & Anatomy, UGA

The above-mentioned proposal was reviewed and approved by “The University of Georgia Institutional Review Board (IRB)” through the exempt (administrative) review procedure authorized by 45 CFR 46.101(b)(2).